In reviewing the work there are two parts to be noticed, and two points of view from which to criticize them: the first fifty pages or so are concerned with a general popular account of the morphology of Fungi in the wider sense, while the remainder is devoted to the setting forth of the British genera and species (so far as they have been worked up) of the two groups specially dealt with.

The general account must strike a careful reader as not only exhibiting a good deal of knowledge on the part of a writer who is wishful to put it at the disposal of all who care for it, and in a pleasant style; but also as showing what enormous advances have been made in the popular exposition of these matters within the last few years. When we look back to the systematic books on Fungi of ten to fifteen years ago, they appear hopelessly dry and uninteresting; whereas here we have a compact, neat little volume, with a store of interesting information thrown in as an introduction to the more serious detailed work which follows.

We do not mean to say that this part of the book is without mistakes or slips, either of fact (*e.g.* the statement on p. 49 regarding mutualism between Fungi and Phanerogams) or judgment (*e.g.* the reference to "phanerogamic Fungi" on p. 11). Moreover, there are evidences of careless proof-reading, as at the foot of pp. 41 and 42. But it is far more easy to pick small holes in a book like this than to do proper justice to what is good and useful in it; and we prefer to dwell on the more important positive points, than to emphasize the fewer and more trivial drawbacks.

The more purely systematic part of the work shows evidence of careful and conscientious industry, suggesting constant reference on the part of the author to type-specimens and authorities. Of course, it is not so interesting to the general reader, but the diagnoses are so clear, and so simply written, that we think any amateur ought to be able to follow them with the object in hand; as for professional mycologists, they will probably wonder that it could all be put so plainly—at the same time, they will suspect something is wrong with the German reference on p. 162, and will probably remark on the chapter on "Fossil Fungi." They may also inquire why *Ustilagineæ* are taken with *Phycomycetes.* The author answers this question on p. 160: he follows Brefeld in regarding *Protomycetes* as linking the two groups. The somewhat antiquated method of obtaining sections, on p. 62, had better have been omitted.

The most interesting points to the systematists will be Mr. Massee's almost consistent alterations of Plowright's authorities for the species of the *Ustilagineæ*, and his addition of one or two new ones—*e.g. Ustilago salveii* (p. 177), *Doassansia comari* (p. 198), and *Protomyces purpureo-tingens* (p. 164); they will also notice the fusion of some species kept apart by Plowright—*e.g.* on pp. 178 and 186—and the separation of the two species of *Tubercinia*, on pp. 203 and 204.

We note, also, that Massee has altered the name of Trail's *Entyloma matricariæ* to *E. Trailii*, possibly on good grounds; but we think it a mistake to use such specific names, here and elsewhere, seeing how much Fungi are in need of useful distinctive appellations.

The figures on the six plates are fairly well drawn and selected, and the references to them are useful and to the point. We have not tested the indices in detail, but they are very well planned, and appear to be accurate.

On the whole, and without being blind to its faults, we think this little book should be welcomed as a useful manual on the subject, and should certainly be in the hands of students of botany who wish to know something of British mycology.

OUR BOOK SHELF.

A Treatise on the Geometry of the Circle, and some Extensions to Conic Sections by the Method of Reciprocation. With numerous Examples. By W. J. M'Clelland, M.A. (London: Macmillan, 1891.)

THIS is a full book, written on the lines which previous works by Irish mathematicians have made familiar to us. The author acknowledges his indebtedness to the writings of Mulcahy, Salmon, and Townsend. He has also freely consulted the similar works by Cremona and Catalan, and in his treatment of the recent geometry has in many cases gone to the fountain-head in the memoirs of Brocard, Neuberg, and Tarry. Though in parts proceeding on parallel lines with Casey's "Sequel," there is a good deal of other matter not to be found in that work. The writer's object is to give a concise statement of those propositions which he considers to be of fundamental importance, and to supply numerous illustrative examples. Many of the exercises are worked out in an elegant manner, and to the major part of the others useful hints are given. Chapter i. is introductory; chapter ii., in four sections, is devoted to "Maximum and Minimum"; chapter iii., also in four sections, rapidly touches upon "Recent Geometry"; chapter iv. discusses the general theory of the mean centre of a system of points; and chapter v. treats of collinear points and concurrent lines.

Chapters vi., vii., and viii. are concerned with inverse points with respect to a circle, poles and polars (with respect to a circle), and coaxal circles. In these chapters will be found ample food for the student. Chapter ix. gives an account of the theory of similar figures, and here we specially notice the sketch of Neuberg's and Tarry's researches on three similar figures. Circles of similitude and of antisimilitude form the subject of chapter x. Here some interesting problems are solved. Inversion (chapter xi.), general theory of anharmonic section (chapter xii.), involution (chapter xiii.), and double points (chapter xiv.) close what must unhesitatingly be called a varied and ample *menu.* The work, being confessedly to a great extent elementary, of course brings before the reader much that is old; there is, however, novelty in the treatment and also in the matter. There is one feature we have omitted to mention, to which Mr. M'Clelland draws attention, and that is the application of reciprocation to many of the best known theorems by means of which the corresponding properties of the conic are ascertained. To go through all the examples would occupy more time than we can spare, but we have dipped into all parts and brought up good results. In the text we have noted one slip: p. 60, l. 12 up should be $\pi - B$. No doubt we have omitted to mark other errata. The figures, which are white lines on a black block, carry our thoughts back to old Cambridge days, when we turned over the pages of our Miller's "Hydrostatics." The geometer will find much to interest him in Mr. M'Clelland's work.

Kalm's Account of his Visit to England on his Way to America in 1748. Translated by Joseph Lucas. (London: Macmillan and Co., 1892.)

KALM was a well-known Swedish botanist and economist of the eighteenth century. In 1747 he became Professor of Economy at Âbo, and in the same year the Swedish

© 1892 Nature Publishing Group

Government and Academy of Sciences commissioned him to go to America, the object being that he should describe the natural productions of that part of the world, and introduce into Sweden any useful North American plants which might be expected to thrive in Northern Europe. Kalm reached England in February 1748, and remained there until August, when he started for America. On his way back, in 1751, he visited this country again, staying about a month. An account of a portion of his travels he afterwards published in three volumes. The part relating to America was translated into English in the eighteenth century by J. Reinhold Forster, but the author's account of England appears now in English for the first time. The work is full of interest, and was well worth translating. Kalm first records his impressions of London and suburbs, and then takes us successively to Woodford, Little Gaddesden, and Gravesend, each of which is made a centre for a number of observations, chiefly in connection with agriculture. To students of the history of agricultural methods the work will be invaluable; but it will also give pleasure to readers with a less serious purpose, for it contains suggestive references to many aspects of English life, and the author always writes accurately and with good taste. The translator has accomplished his task with great spirit and intelligence.

LETTERS TO THE EDITOR.

[*The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts intended for this or any other part of* NATURE. *No notice is taken of anonymous communications.*]

The University of London.

IT is always a pleasure to read Mr. Thiselton-Dyer's expressions of opinion on University organization. I have before now joined my word to his in condemnation of Sir George Young's proposed "Albert" or "Gresham" Charter. Nevertheless, I must beg you to grant me space to point out some inaccuracies in Mr. Dyer's letter in your columns of February 25 (p. 392), the purpose of which seems to be to give reason for distrusting, or, at any rate, treating with little confidence, University organizations on the German or professorial model.

Mr. Dyer rightly enough appeals to his own early experience as a teacher and student. It is therefore fair to point out that this experience does not include a German University, and that the conception of it sketched by him, and of a professor's relations to his pupils therein, is entirely erroneous. Mr. Dyer cannot free his mind of the University of London tradition. He regards the German as well as all Universities as organizations for bringing candidates up to a certain pitch of examination-room performance. This is not what a German University attempts. The measure of its success is not what Mr. Dyer would suggest, but is found in the contributions to science, the new knowledge created by the professor and his students, and in the spread of a love for producing such new knowledge. Mr. Dyer attributes to Lord Sherbrooke a strange saying—namely, that professors who examine their own students are comparable to "tradesmen who sample their own goods." I can hardly credit that Lord Sherbrooke ever said anything so unmeaning. We have all heard the professor-examiner compared to "a merchant who brands his own herrings"—but this "sampling of his own goods" is a new charge.

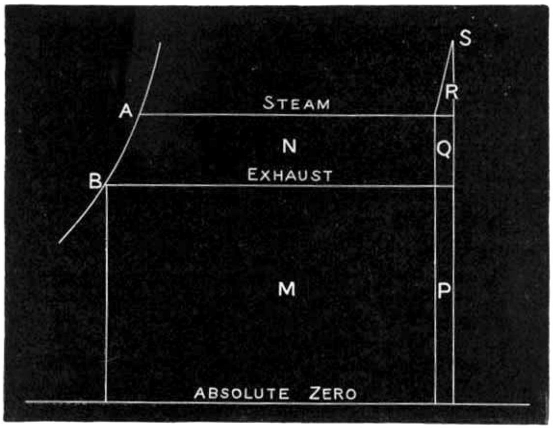
Lastly, I must point out that Mr. Dyer, by inadvertence, attributes to me a statement, or rather assent to a statement, before the Royal Commission on the proposed new University for London, which had exactly the opposite significance to that which he gives to it. Mr. Dyer says that I admitted to Sir William Thomson that "a teacher may, with judiciousness of course, and with common-sense in his teaching, teach the best that he knows" under the present University of London system. I am glad to note that Mr. Dyer has looked at the Blue-book. But if he had read more carefully he would have seen that Question 662, by Sir William Thomson, was, "Can an examiner under the London system ask the best that he knows?" and that my answer was, "Probably not." Then Sir William continued (Question 663): "But, *on the other hand*, a teacher may, with judiciousness, &c., teach the best that he knows?" to which I answered, "Yes." Then said Sir William (Question 664), "*If he is examining his own pupils* he may bring into the examination something of the best and the newest?" to which I replied, "Certainly."

It is clear enough that Sir William Thomson's proposition, to which I assented, was that, under the London system of external examiners, an examiner cannot put questions involving the best and newest; yet a teacher may and should teach the best and newest; and if, contrary to the principle of the London system, the examiner is the teacher, he *can* introduce with judgment into the examination this element of the best and newest.

Mr. Dyer has not, it seems to me, yet mastered the distinctive features of the German or professorial University system, and is, therefore, not a trustworthy guide as to its advantages and disadvantages. E. RAY LANKESTER.

Superheated Steam.

A COMMUNICATION from Lord Rayleigh, under the above heading, in NATURE of February 18 (p. 375), draws attention to a misunderstanding which has been pointed out by me on every occasion in the last twelve years when I have been explaining the thetaphi diagram in public, saying that "only the heat which superheated had its efficiency increased, according to the temperatures at which its respective portions were imparted to the working substance." Mr. Willans has also been disseminating correct views regarding this point amongst those who visit his engine-testing laboratory. The diagram given by me in my paper on thetaphi, in 1880, makes this very plain.



The vertical ordinates here are absolute temperatures, and the area is heat or energy. Without superheating, Carnot's law gives, between temperatures A and B—

$$E = \frac{W}{H} = \frac{\text{Work}}{\text{Heat}} = \frac{N}{M + N}.$$

Superheating to temperature S, the same law gives—

$$E_s = \frac{W_s}{H_s} = \frac{\text{Work}}{\text{Heat}} = \frac{N + Q + R}{M + N + P + Q + R}.$$

An arithmetical expression for these quantities, practically accurate, is obtained by extending the formula given in Mr. Willans's paper on engine trials, at the Institution of Civil Engineers—

A = steam temperature, not superheated.
B = temperature of exhaust.
S = superheated temperature.

The temperatures are all absolute, and, to suit engineers, in Fahrenheit measure, and the steam data of Regnault are adopted. The mean specific heat for the range of superheating is taken = 0·5. This will be nearly correct at high temperatures, and this is strictly in accordance with my statement that the specific heat of steam at low temperatures is 0·39 at constant pressure. The above expressions become, without superheating,

$$E = \frac{W}{H} = \frac{\left(\frac{A - B}{A + B} + \frac{1437}{A} - \cdot 7\right)(A - B)}{1437 + \cdot 3A - B},$$

© 1892 Nature Publishing Group